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ILLUSTRATIONS

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OF

MR. HUME'S ESSAY

CONCERNING

LIBERTY AND NECESSITY;

IN ANSWER TO

DR. GREGORY OF EDINBURGH.

BY A NECESSITARIAN. *K*

LONDON:

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MR. HUMPHREY'S ESSAY

LIBERTY AND NECESSITY



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ADVERTISEMENT.

THE Author of these Illustrations is aware, that neither his age, nor habits of reflection, authorise him to intrude upon the world, speculations in a branch of Science, where maturity of judgment, patient thinking, and habits of nice discrimination, are essential to success. His apology is short. He pretends to nothing new or uncommon. His *sole* purpose is to vindicate the fame of a departed Philosopher, from the imputation of *mala fides*, with which a living Author has endeavoured to stain his memory. The design he feels to be praise-worthy. The few into whose hands these pages may fall, will judge how far it is accomplished.

ERRATA:

Page 8. l. 17. For ~~alternate~~ *read* ultimate

11. l. 17. For ~~exerting~~ *read* exciting

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The Author of *Our Illustrations* is aware that not
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impose upon the world, particularly in a branch of
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and habits of nice discrimination, are often to be
this apology is due. It is true, to nothing new or
uncommon. He is prepared to receive the same
a detached illustration, and to receive it with
with which a young Author has endeavored to fill his
memory. The design of this is to be made a study. The
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ILLUSTRATIONS, &c.

THE order of succession in the events of the material world is established on immutable principles. Has the substance X, when placed in certain circumstances with respect to the substance M, been followed in one instance by the event or change A; we may then expect with confidence that the same event, the same A, will at all times take place, when the same X and M are again placed in the same circumstances. When atmospheric air, in contact with red-hot charcoal, is confined by a proper chemical apparatus; has it in one experiment been found that part of the charcoal was consumed, that part of the air was abstracted, and that in its stead there was a different kind of elastic fluid

occupying nearly the same volume; the Chemist may then rest assured, that a thousand experiments, conducted in the same manner, will, in every instance, afford the same results. But let him reduce the temperature of the charcoal to that of the human body, or let him deprive the air of its oxygen; the former changes, the former A will no longer be produced; no part of the air will be abstracted; no part of the charcoal will be consumed, and no elastic fluid will be generated. Let him then replace the charcoal and air in their former state, but let a new agent be introduced; while the air serves for the combustion of the charcoal, let it be in contact with quicklime; the event will still, in some respect, be different from the first A; the charcoal will indeed be consumed, and the air decomposed, but the elastic fluid arising from their union will be absorbed by the quick-lime.

From innumerable examples of this order in the succession of events, it has become, in the physical sciences, a fundamental principle, established and confirmed by the experience of ages, that from the mutual influence of two substances, consisting of the same parts, possessing the same qualities, and placed in the same circumstances, the same changes may always be expected. It has also been found from experience, that by altering the composition or qualities of X or M, or by altering the circumstances in which they are placed, there will, in some cases, be no change whatever, and, in other cases, some change different from A. But this maxim is not of such universal application as the former. It may happen that A shall continue the same, after numerous alterations in X and M. The charcoal may be rough or polished, jet-black or brownish, compact or spongy, - in powder

or in mafs; the air may be left at reft, or may be kept in conftant motion; it may be denfe or rare, hot or cold, without influencing the change A. Many of the attending circumftances may alfo be diverfified, without altering the nature of the event. The charcoal may exift as fuch; or may be concealed in animal or vegetable matter, or in alcohol, or in vinegar, or in plumbago; or it may be formed during the experiment, the inftant only before its combuftion. The principle derived from the air may as well be derived from water, from acids, from metallic oxids, or from animal and vegetable fubftances. The elastic fluid formed during the combuftion will be abforbed by quicklime, but will pafs unchanged through pounded clay, or flint-ftone.

Thefe examples, which might be multiplied without end, fhew that *some* but *not all* changes in X and M, that *some* but

not all changes in the attending circumstances, alter the nature of A. In what changes of the attending circumstances, it may then be asked, will an event different from A take place, and what parts or qualities of X and M are necessary for its production? To this question no answer, prior to experience, can be given. Observe with attention the course of nature. Where the phenomena spontaneously presented by nature, are insufficient for your purpose, make experiments. You may safely rely on these lessons of experience. When interpreted right, and applied with discrimination, they serve as unerring guides to the future; the maxim, that from like objects placed in like circumstances, like events may always be expected, having proved in no instance fallacious.

Changes or events, when considered with relation to what has been observed,

or is conceived uniformly to precede them, are, in physics, termed *effects*; that which precedes them is termed their *cause*; and the cause and effect are said to be *constantly conjoined*, the same cause always preceding the same effect, and the same effect always following the same cause. The phrase *constant conjunction*, was first brought into general use by Mr. Hume; but the notion expressed by it is, and must ever have been tacitly assumed in all the reasonings of mankind, from the past to the future. Their belief in it is implied in all their actions, and speculations respecting events. But although this notion be necessarily involved in every anticipation of the future, it does not the less stand in need of illustration; for the phrase *constant conjunction*, is by no means free from ambiguity, and, misconceived, might lead to the most false and absurd conclusions.

In the most obvious sense in which the constant conjunction of cause and effect may be taken, we are to understand by it, that the same X and M, in the same circumstances, will at all times produce the same effect A. But this view is by far too limited ; this explanation will not apply to the whole of what we mean, by announcing, that the same causes and effects are constantly conjoined. Many of the collateral circumstances of the experiment may be altered ; many of the parts or qualities of X and M may be modified, or even abstracted, without influencing the nature of A. Air, for example, affects our feelings principally by its temperature, its velocity, and its dryness or humidity ; it accelerates the motion of a ship by its momentum ; it elevates the mercury in the barometer by its gravity ; it raises the valves of the air-pump by its elasticity ; it precipitates lime-water by its

carbonic acid ; it contributes to form the volatile alkali by its azote ; it supports combustion and animal life by its oxygen. In producing any one of these effects (A), X is but partially concerned. Its oxygen adds not to its elasticity, nor its elasticity to its power of maintaining combustion. We are to consider certain parts or qualities only, x and m of X and M, as necessary for the production of A ; and these we learn from experience, are not confined to X and M, but may exist in many various substances, in the state requisite for the production of A. The impulse communicated by the wind, may be given by muscular exertion, or may be derived from the ultimate formation and condensation of an elastic fluid. The oxygen supplied by air in combustion, may be obtained from water, or from acids. One of the principal objects, indeed, of philosophic investigation, is to determine with preci-

sion the parts or qualities of X and M, on which the production of A depends ; and to ascertain by what changes in the attending circumstances, the nature of A is modified, or its existence prevented. This knowledge, again, is attained by repeated experiments, where all the extraneous circumstances to the production of A are excluded ; by detecting, in every situation where A occurs, the circumstances which appear essential to its production ; and by observing in what manner it is influenced by the interposition of other substances, or by changes of any kind in the attending circumstances. When we, therefore, explain what is meant by the constant conjunction of cause and effect, by saying, that the same X and M, in the same circumstances, will at all times produce the same effect A ; we are not to forget, that after many alterations in X and M, and many changes in the circumstances in

which they are placed, the effect A may still result from them. We are farther to recollect, that x and m, the parts or qualities of X and M concerned in the production of A, may continue to produce A, though disjoined from X and M, and existing in other substances, and placed in quite different circumstances. In all cases our sole guide is experience. By experiment and observation, we are taught in what combinations of circumstances A is produced; and we expect with confidence, as the result of our uniform experience, that in whatever circumstances A has once been produced, in the same circumstances it will always be produced.

These illustrations may explain what Mr. Hume seems to have meant by the constant conjunction of cause and effect. It may be added, that the effect A must be an event, or if it is thought proper, we may comprehend under A many co-ex-

istent or successive events of the same kind ; while the cause with which A is constantly conjoined, cannot, strictly speaking, be called an event, but consists in the mutual relation of x and m. This relation of x to m, it may farther be observed, will subsist entire in one part of physics, after changes which, in other branches of physics, would have lessened, or entirely destroyed its effect. By diluting concentrated acids with water, their action upon iron is increased ; but they are rendered less injurious to organized substances. Placing X and M at some distance, destroys not, though it lessens their mutual gravitation ; but effectually prevents them from exciting on each other any kind of chemical action. Oxygen is alike consumed in the combustion of fuel, and in the support of animal existence : in the former process it may be obtained from the vapours of the oxide-

nated muriatic acid ; but these vapours are destructive of every thing that lives. An elastic tube will remain distended, while the force that has been applied to it is not diminished ; but a muscular tube, in the same circumstances, will recover itself, and overcome the power to which at first it had been obliged to yield. Yet, amidst all these variations, Mr. Hume's principle of constant conjunction ceases not to be recognized. In every part of physics we invariably find, that in precisely the same circumstances, where these can be ascertained, precisely the same effects are always produced.

What is meant by the constant conjunction of cause and effect in physics, having been explained and illustrated, we are prepared to consider the application of the same principle to mind. It has been maintained, that in the same state of mind and body, the same impressions from

without produce always the same sensations ; that in the same state of mind, the same evidence has always the same influence in regulating belief, and the same motives in determining volition. The two first of these opinions no one seems disposed to controvert ; but the last has been eagerly combated by many. Yet, in a general view, nothing appears more consonant to the experience and common sentiments of mankind. The uniformity of human nature in different ages and nations, appears through all the diversities of situation in which mankind have been placed. The minerals described by Pliny and Theophrastus, are not more similar to those of the present day, than the luxurious manners of the Romans, as they are painted by Sallust, resemble the dissolute manners of modern courts. Nor does man appear less firmly persuaded that events succeed each other, according to invari-

able laws, in his judgments respecting voluntary agents, than when he considers the changes that take place in the other departments of nature. His anticipation of the future, and retrospect to the past, shew that his conviction is equally fixed in both cases. He perceives that salts crystallize, and that vegetables decompose water at present ; he believes they did so in the time of Pliny, and that they will do so ages hereafter. He is witness to the abuses of arbitrary power ; he sees despots, placed above retribution from their fellow-men, exercise the most grievous oppression, and indulge in the most scandalous excesses : This experience gives credibility to the stories told of Nero and Caligula ; and he believes that future tyrants will approach to Nero in wickedness, as they approach to him in power and situation.

Though the general features, it may indeed be said, of the human character remain in all ages the same, yet, like the human face, they are diversified by many thousand minute differences; so that, in apparently the same situation; perhaps not two human beings will act precisely in the same manner, and with the same views. But in this respect the human mind only preserves its analogy to the other works of nature. The growth of plants and crystallization of minerals are influenced by the situations in which they have been placed, as well as the actions of men.—It may be said with more plausibility, and indeed with truth, that we have by no means full and complete evidence, that there is the same uniformity in human conduct, which we believe is to be found in the operations of unintelligent matter. We cannot show in mind, that the same X and M, in the same circum-

stances, will always produce same A. On the contrary, we frequently observe different effects, A B or C, when the previous state of mind M, the motive X, and the attending circumstances, so far as any of these can be discerned, are to appearance the same. How are these irregularities to be reconciled to the principle of constant conjunction?

These objections Mr. Hume seems to have anticipated; and while, to a certain extent, he admits their truth, he denies the justness of the reasoning founded on them. Similar objections might, indeed, be opposed to the constant conjunction of cause and effect, in most of the physical sciences. In mechanical philosophy, it is true, and in the simpler processes of chemistry, the principle of constant conjunction is established, from a full and complete induction of facts; that is, it can be shown, that from the same X and M, in

the same circumstances, the same A will always follow. But this constant conjunction cannot be rigorously proved, in the more complicated operations of chemistry, in many of the changes incident to the atmosphere, in many phenomena of electricity, nor in the functions of animals and vegetables. In these departments of nature, different effects present themselves at different times, in circumstances, so far as we can discern, the same: Yet we do not on that account imagine that in these sciences there is no regular order in the succession of phenomena; we know, that “in every part of nature
 “there is contained a vast variety of
 “springs and principles, which are hid,
 “by reason of their minuteness, or remoteness; and we find that it is at least
 “possible, the contrariety of events may
 “not proceed from any contingency in
 “the cause, but from the secret opera-

“ tion of contrary causes *.” The principle of constant conjunction, it is true, leads us to expect with confidence the same A, when the same X and M are placed in the same circumstances ; but the application of this principle supposes the knowledge of all the previous circumstances that can influence the event ; and therefore, in complicated changes, or in the more obscure and unknown parts of nature, when we are mistaken in our anticipation of the event, and meet with B instead of A, we do not suppose that the principle of constant conjunction has been suspended, but that some differences in X or M, or in the attending circumstances, had escaped our notice. In this interpretation we are justified, by the difficulty of ascertaining all the circumstances capable of influencing changes, when they are complicated, or when we are only begin-

* Hume's *Essays*, Vol. II. p. 92.

ning to investigate them; and by our uniform experience of the invariable and constant conjunction of cause and effect, in all cases where we are assured that the preceding circumstances are the same. We rely with increasing confidence on our principle, when we find, that in proportion as our knowledge extends in those sciences where such apparent exceptions occur, the greater regularity we perceive in the operation of their several principles of change, and the nearer approximation to a rigorous proof of the constant conjunction of cause and effect.

If we are guided by reflections of this kind, in judging of anomalies in physics, to be consistent, they should still be used, when we are embarrassed with similar objections to the principle of constant conjunction in mind. No one denies, in general, the uniform operation of those principles which determine the mind in wil-

ling. The apparent exceptions to this uniformity ought not to have greater weight with us than when similar anomalies occur in physics. Are the instincts, habits, appetites, desires, affections, judgments of good and evil, and of duty, by which the determinations of the mind are regulated; are *these* less various, less complicated in their operation, less hidden from inspection, less influenced by collateral circumstances, than the principles of change which direct matter? There are, besides, peculiar difficulties in discovering the secret and nicer springs by which mind is actuated. We cannot *here* multiply experiments at pleasure; we can seldom make observations with accuracy; degrees of quality we may in some measure distinguish, but we have no scale for quantity. Our knowledge of mind, derived from observations on the conduct of others, must necessarily be vague and general, since we

can never be acquainted with all their motives, inclinations, and principles of action. By reflection, we may indeed be minutely acquainted with the operations of our own mind ; but how few are qualified for the investigation. There is also greater difficulty in ascertaining with precision what determines the will, than in observing what influences the understanding. While we are hurried away by violent passions, nothing is farther from our thought than analysing our desires and aversions, and marking to what extent, and in what combinations they influence us. After the storm of passion has subsided, we seek in vain to recall to memory the fugitive emotions that have passed through the soul ; they are gone, and cannot, like events in physics, be renewed and examined at leisure. These difficulties in the philosophy of mind ought not to discourage us from the subject, but they should

caution us against rejecting the immutability of the laws of mind, because, to our limited and superficial view, some of its phenomena appear anomalous. If apparent exceptions are insufficient to shake our belief in the constant conjunction of cause and effect in physics, much less should they in mind, where the difficulties of the investigation are so much greater.

But the intention of this essay is not to collect arguments in proof of the necessity of human actions ; it is merely to illustrate the reasoning of Mr. Hume, where it appears to have been misunderstood by his opponents. It will, therefore, be sufficient to repeat, that the whole of his argument is founded on our experience of the uniformity of human conduct, as evinced by the records of past times, and implied in the daily intercourse of society. It may be added, that from these facts he pre-

tends to deduce nothing farther than the immutability of those principles by which the mind is directed in willing, and that “ this experienced uniformity in human actions is a source, whence we draw inferences respecting them *.” *This* is the doctrine of necessity ; *this* is the constant conjunction of cause and effect maintained by Mr. Hume ; *this* is the philosophy which has been stigmatized as subversive of moral distinctions, as eradicating the notions of right and wrong from the human breast. These imaginary consequences of Mr. Hume’s philosophy shall be left to the consideration of moralists. The preceding illustrations were intended to answer objections of a different and apparently more formidable kind ; objections which have been announced as containing nothing less than the mathematical demon-

* Hume’s Essays, Vol. II. p. 94.

stration of the *falsity* and *absurdity* of Mr. Hume's doctrine. This confident language has been used, and the objections alluded to proposed, by Dr. Gregory of Edinburgh, in a work which, for the honour of science, it is hoped, will, in some of its features, long remain *unique*. *This work*—but regard for the otherwise estimable character of its author, forbids to censure it in that language which the intemperance of his own might justify.

The method which Dr. Gregory has employed to confute Mr. Hume's doctrine of necessity, is to suppose the doctrine true, assume it as such, and trace the necessary consequences of it to conclusions that are either false or absurd; the falsity and absurdity of the consequences necessarily implying the same defects in the principle from which they are strictly deduced. To this mode of reasoning no pos-

fible objection can be made. Provided the reasoning be just, it must be conclusive.

Dr. Gregory is not to be told that his *reductio ad absurdum* may be repelled, either by exposing some fallacy in his demonstration, or by showing that the principle which he has assumed, is not the same with that maintained by Mr. Hume. In the former case, his supposed false and absurd consequences *must* fall to the ground; in the latter case, they *might* be admitted, but having been deduced from a different principle, *their* imperfections could not be imputed to Mr. Hume's doctrine. No error, it is confessed, has been detected in Dr. Gregory's reasoning; it is strictly logical; no man can refuse his assent to it; but the principle assumed, and from which he reasons, *is not that maintained by Mr. Hume.* This, I trust, will appear from a comparison of Mr. Hume's doctrine of the constant conjunction of cause and effect,

with that assumed as Mr. Hume's by Dr. Gregory.

By the constant conjunction of cause and effect, Mr. Hume, to use his own language, means, that "like objects placed in like circumstances, will always produce like effects *;" or, in the language of these illustrations, that the same X and M, in the same circumstances, will always produce the same effect A. But alter, in any respect, X or M, or vary the circumstances in which they are placed, and the principle of constant conjunction instantly becomes insufficient to determine the event. A, it is true, may still be produced; but, for any thing implied in the principle, so may an effect different from A. "It is making a new experiment, the consequence of which is always uncertain. One may sometimes conjecture, from analogy, what will follow; but

* Treatise of Human Nature, Vol. I. p. 187.

“ still this is but conjecture *.” Nothing is left but to make the experiment, and then the principle of constant conjunction may be applied; for whatever effect follows, the same may always be expected in the same circumstances. In like manner, the same Y and M may always be expected to produce the same effect B, in the same circumstances; but vary the circumstances, and the event becomes uncertain; trial must be made, the event in this new combination of circumstances noted; and the same event, we may rest assured, will in future always take place, when the circumstances are the same.

These essential particulars in Mr. Hume’s doctrine of causation, have been omitted by Dr. Gregory, in the account which he has given of that doctrine in his essay, and overlooked by him in all his reasonings respecting it. Continuing to use the

* Hume’s Essays, Vol. II. note (I).

language of these illustrations, he has represented Mr. Hume as having maintained, that M continuing always the same*, the same X will “always and inevitably” produce the same A, and the same Y, in like manner, produce the same B†. Consequently, the effects A and B being supposed effects of the same kind, the simultaneous application of X and Y to M must be followed by $A+B$, $A-B$, or $A\swarrow B$; as X and Y directly concur, directly oppose one another, or neither directly concur, nor yet are directly opposite‡. All

* Philosophical and Literary Essays, by Dr. Gregory of Edinburgh, Vol. I. p. 139.

† *Ib.* p. 29. 172. *et passim.*

‡ The following are the algebraical symbols used by Dr. Gregory, and their explanation:

He uses $=$ in its usual acceptation.

He denotes the exact concurrence of causes with causes, and of effects with effects, by $+$.

He denotes their direct opposition by $-$.

He denotes their combination, when they neither exactly concur, nor yet directly oppose one another, by \swarrow .

these consequences are found true in numberless cases in physics, but notoriously false with respect to the voluntary determinations of the mind; and from their falsity in the latter case, Dr. Gregory argues, that the principle from which they are deduced, must be equally false when applied to the will.

This conclusion will hardly be controverted. The constant conjunction of cause and effect, in the sense in which that expression is used by Dr. Gregory, is not only false with respect to the will, but also when applied to the operations of the understanding, and to some of the most important branches of physics. Yet it cannot

He denotes the constant conjunction of cause and effect, by \equiv .

The following are his deductions from the constant conjunction of cause and effect, as assumed by him :

$$X \equiv A.$$

$$Y \equiv B.$$

$$X+Y \equiv A+B, \quad X-Y \equiv A-B, \quad X \wedge Y \equiv A \wedge B, \quad .$$

be said, that the truth of Mr. Hume's doctrine is at all affected by this admission; for the consequences $A+B$, $A-B$, $A \nabla B$, do not follow from the principle of constant conjunction, as it is maintained by Mr. Hume. It is implied, indeed, in the doctrine of that philosopher, that the same X and M will, in the same circumstances, always produce the same A; and that the same Y and M will in the same circumstances always produce the same B; but vary in any respect the circumstances, and what event shall then follow, may be conjectured from analogy, but cannot be necessarily inferred from the principle. The same Y and M, we admit, will always, in the same circumstances, be followed by the same B; but change the circumstances, by introducing X along with Y, and instead of B, the effect may be C or D, or there may be no effect whatever referrible to Y. In a word, the consequences

$A \vdash B$, $A - B$, $A \nabla B$, cannot be deduced from the constant conjunction of cause and effect; because the principle ceases to be applicable, when a new agent or new circumstance is introduced into the experiment; nothing in that case remaining, but to observe the event; and this event may in future always be expected, when the experiment is repeated in the same circumstances. Dr. Gregory's demonstration is therefore inapplicable to his purpose, inasmuch as it is founded on the suppression of part of Mr. Hume's doctrine, and consequent misrepresentation of the whole. That this should have occurred in a work professedly written to convict Mr. Hume of *mala fides*, is not a little singular, is not a little humiliating. To justify us in taking the most charitable side of the *dilemma*, in which this unlucky mistake seems to place our good opinion of the Doctor, we may recur to his own sea-

sonable acknowledgment, that “ he understands very little of Mr Hume’s metaphysics *.” The confession is ingenuous, and such as we ever expect from Dr. Gregory’s candour ; but it was unnecessary : The essay implies as much.

That Mr. Hume’s notion of constant conjunction, and that assumed as Mr. Hume’s by Dr. Gregory, have been fairly and strictly translated into the language of these illustrations, admits not, it is obvious, of other proof than an appeal to the respective writings of these authors. It were easy to select particular passages, in confirmation of the sense given to the essential parts of their argument ; but, the experience of most controversies showing how liable this practice is to abuse, a reference is rather made to the plain and obvious meaning of their works, as they shall be understood by men of candour and

* Introduction to Dr. Gregory’s Essays, p. 170.

competent knowledge. It may not, however, be improper, indirectly to justify the explanation given of Mr. Hume's doctrine, by showing, that in the sense in which the constant conjunction of cause and effect is received by Dr. Gregory, it is inapplicable to the judgments of the mind, respecting truth and falsehood; and to chemistry, one of the most important branches of physics; inasmuch as it leads to false conclusions in both. *Mr. Hume* surely will not be thought so deficient in the acuteness necessary for tracing the consequences of his own philosophy, as would be implied in the introduction of a principle by him, as universally true, which was next to being universally false.

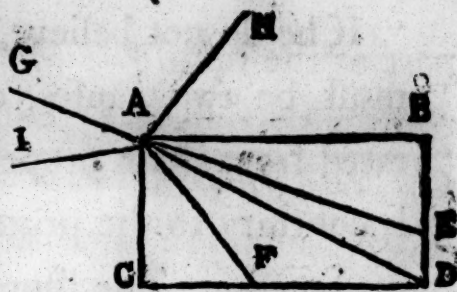
It is admitted by all mankind, and expressly acknowledged by Dr. Gregory, that the effect of evidence in determining belief, is absolute and irresistible, and independent of any discretionary power on the

part of the mind *. The mind is therefore, with respect to belief, in what Dr. Gregory calls the state of *inertia* †. He observes, indeed, that the conjunction of evidence and belief is not constant, but separable; yet, when this observation is explained, it amounts to nothing more than saying, that one kind of evidence has no influence against evidence of a different kind; that testimony, for example, has no influence, in opposition to distinct memory, or to immediate perception, or to mathematical demonstration: And, from other parts of his Essay, he seems explicitly to admit, that evidence, when opposed by evidence of its own kind and authority, is constantly conjoined with its ef-

* Introduction to Dr. Gregory's Essays, p. 246, and Essays, p. 13.

† The meaning of the term *inertia*, as used by Dr. Gregory, explained, Essays, p. 158.

fect *. Suppose then M, in pursuit of N, is told by X and Z, men of known vera-



city, and well acquainted with N, that they saw N at a certain house, walking from A to B; and suppose he is the instant thereafter told by Y, who is also a man of veracity, and well acquainted with N, that he saw N at the same hour walking from A to C; what belief must M necessarily entertain? Taking the constant conjunction of cause and effect, in the sense adopted by Dr. Gregory, we must reason like him, in the following manner†:

“ It is, in the first place, self-evident,
 “ that M must either believe, or not be-
 “ lieve.

* Compare Introduction to the Essays, p. 247, and Essays, p. 210. with the latter part of section 8th, and particularly with p. 220.

† Essays, p. 229.—232.

“ If he do not believe, it is plain there
 “ must be two causes, completely separated from their proper effects ; which
 “ is contrary to the principle of constant
 “ conjunction. The supposition of his not
 “ believing, may therefore be set aside
 “ at once, without farther examination.

“ M must then believe ; and if he believe, he must believe something.

“ If he believe that N, at the hour specified, was walking from A to B, which,
 “ from the conjoined testimonies of X
 “ and Z, we should think very natural,
 “ and very wise for him to do, a very
 “ powerful evidence, the testimony of Y is
 “ completely separated from its proper effect ; which is contrary to the principle.

“ If he believe that N, at the hour specified, was walking from A to C, in
 “ consequence of the testimony of Y,
 “ then the testimony of X and Z are completely separated from their proper effect ; which is contrary to the principle.

“ If he believe that N was walking
 “ from A to E, or from A to F, inter-
 “ mediate between AB, or AC and AD,
 “ either the testimonies of X and Z, or
 “ that of Y, must be in part separated
 “ from their proper effects; which is con-
 “ trary to the principle.

“ If he believe that N has gone in any
 “ other direction, such as AG, AH, or
 “ AI, there must be two distinct testi-
 “ monies, separated from their proper
 “ effects, and belief without evidence,
 “ and in opposition to evidence; which
 “ is doubly or triply contrary to the prin-
 “ ciple.

“ M then has nothing for it, but peace-
 “ ably, and without murmuring, to be-
 “ lieve that N was walking from A to D;
 “ for, in this case, both testimonies are
 “ conjoined with belief, as far as is con-
 “ sistent with their mutual interference
 “ and modification. The result partakes

“ of both, and is different from what ei-
 “ ther testimony would singly have pro-
 “ duced. And the difference between the
 “ result from the combination of the testi-
 “ monies, and that which would have
 “ taken place, if only one had been ap-
 “ plied, will be exactly equal to the full
 “ supposed effect of the other testimony ;
 “ viz. $BD=AC$, or $CD=AB$.”

If it should be insisted that Dr. Gregory has not admitted the constant conjunction of evidence and belief, even with the limitations mentioned ; it may be recollected, that having admitted the *inertia* of mind, with respect to belief, false and absurd consequences *must necessarily* follow from this inertia, whether the conjunction of evidence and belief be constant, or only separable. If it be constant, the preceding reasoning will suffice ; if it be separable, the reasoning used by Dr. Gregory (sect. 16th), may be employed for the purpose.

“ Chemistry,” says Dr. Gregory, “ affords innumerable instances of the truth of the same general inferences ($X \equiv A$, $Y \equiv B$, $X + Y \equiv A + B$, $X - Y \equiv A - B$, $X \wedge Y \equiv A \wedge B$), and consequently of the principles; and we uniformly rely on them in chemistry, as well as in mechanics*.” Who are meant by “ we” in this curious passage, it is not easy to conjecture. Not chemists sure; for the inferences are repugnant to every thing known in chemistry. To take one of many hundred thousand examples, let X represent the affinity of sulfuric acid and potasse, A = the effect of this affinity, or sulfate of potasse, Y = the affinity of carbonic acid and potasse, B = the carbonate of potasse; then

$$X \equiv A$$

$$Y \equiv B$$

$$X \wedge Y \equiv A \wedge B$$

What chemical prodigy is $A \wedge B$? Alas! chemistry, “ nova monstra quæstæ,” must

* Essays, p. 197.

be for ever degraded from the rank of science; chemical causes and effects " must " be sometimes conjoined, and sometimes separated, purely and strictly by " chance;" for potasse has no " discretionary power *."

If it be said that affinities " which do " not exactly concur, and yet" tend to form combinations " that cannot take " place separately, must be considered as " directly opposing one another; the supposition," we should be told by Dr. Gregory, " is inconsistent with the universal analogy of physical," in which he expressly includes chemical " causes †." But admitting it, for really in the present case it would be hard to maintain the contrary; what means the new inference from the principle $X - Y \equiv A - B$? What is $A - B$? Is sulfate of potasse less so, for the presence of carbonic acid? It may in some cases, we grant, be more easily decomposed, from

* Essays, p. 343.

† Essays, p. 244.

the other being present ; but is the combination less complete ? Does it want any of its usual properties ? While no other agent, tending to decompose it, is introduced, does there exist any perceptible difference between A and A—B ; or any, the most remote, analogy, between this A—B, and the result of an opposition of forces in mechanics ? Motion is the plain and obvious effect of mechanical force ; combination of chemical affinity ; A—B is distinguished from A in mechanics, by the retardation of the motion ; but is the combination less perfect in A—B than in A ? Contrary affinities in chemistry are unable to modify the effect of superior affinities ; they merely facilitate decomposition ; Dr. Gregory's formulæ are therefore inapplicable, and even unintelligible in that science. It cannot be said that our comprehension is much assisted by the curious farrago of chemical facts, with which, in obedience to Bacon's so frequently and

so ostentatiously quoted precept, he has laboured to enrich "the thorny and barren regions of metaphysical speculation." These, however, with the general tenor of his remarks on chemistry, might with some minds give rise to whimsical speculations. Plausible reasons, in truth, are not wanting to persuade, that the Doctor has devoted to chemistry part of those unlucky moments which he mispent on Mr. Hume's metaphysics. A hint on this delicate point will be sufficient. In his future volumes, the relation of cause and effect in chemistry might as well be postponed till some happier hour.

The incongruity of Dr. Gregory's notion of constant conjunction, and his consequent formulæ, with the most obvious facts and laws of chemistry, might be illustrated in many different ways. It is held as a fundamental principle in chemistry, that bodies are decomposed, and new combinations formed, in consequence

of the *divellent* affinities being more powerful than the *quiescent*. It is a necessary consequence of this principle, were chemists to lose their time in such useless subtleties, that if the affinity of M and N, in any given circumstances, be precisely equal to the affinity of N and P, no combination can take place, till some change is made in the circumstances, or till some new agent is introduced. At the same time it is a certain fact, that when affinities are unequal, the stronger prevails, and produces combinations. Now, let these "very plausible propositions" pass through the ordeal of Dr. Gregory's algebra, and the following absurd consequences will be extracted from them. Let $X =$ the affinity of sulfuric acid and potasse, $Y =$ an affinity equal to X , $\frac{Y}{m} =$ the affinity of carbonic acid and potasse, $A =$ sulfate of potasse, and $B =$ the effect of Y ; then

$$" X \equiv A = Y \equiv B,$$

$$" X - Y = 0 \equiv 0,$$

“ $X - \frac{Y}{m} = X \equiv A$; which is absurd *.”

To take but one other example : $X \equiv A$, then $m X \equiv m A$. Let $X =$ any degree of temperature, $A =$ the expansion of air by that degree of temperature, then $m X \equiv m A$ † : but this is not true in fact.

What are we then to conclude ? That in the *reductio ad absurdum* of Dr. Gregory, there is an *error personæ* ; that it is not Mr. Hume’s doctrine of necessity, but a doctrine of his own invention, which he has demonstrated to be false and absurd.

* Essays, p. 245.

† Essays, sect. 12th, Appendix, p. 634.

$m X$ is perhaps exceptionable, as the real zero is unknown ; but in the present argument it is immaterial whether it be -600° or -1200° .



